Green Spaces to Improve Waterways and Communities

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Green Spaces to Improve Waterways and Communities

- This topic is Chapter 15 in the recently published manual entitled *Green Infrastructure Implementation* published by the Water Environment Federation (WEF).

- Other Chapters address topics such as legal, financing, valuation, maintenance, adaptive management, feasibility, and different scales of implementation.

- Manual is intended to address both programmatic issues as well as technical approaches to implement Green Infrastructure.

Green Spaces sites for Green Infrastructure

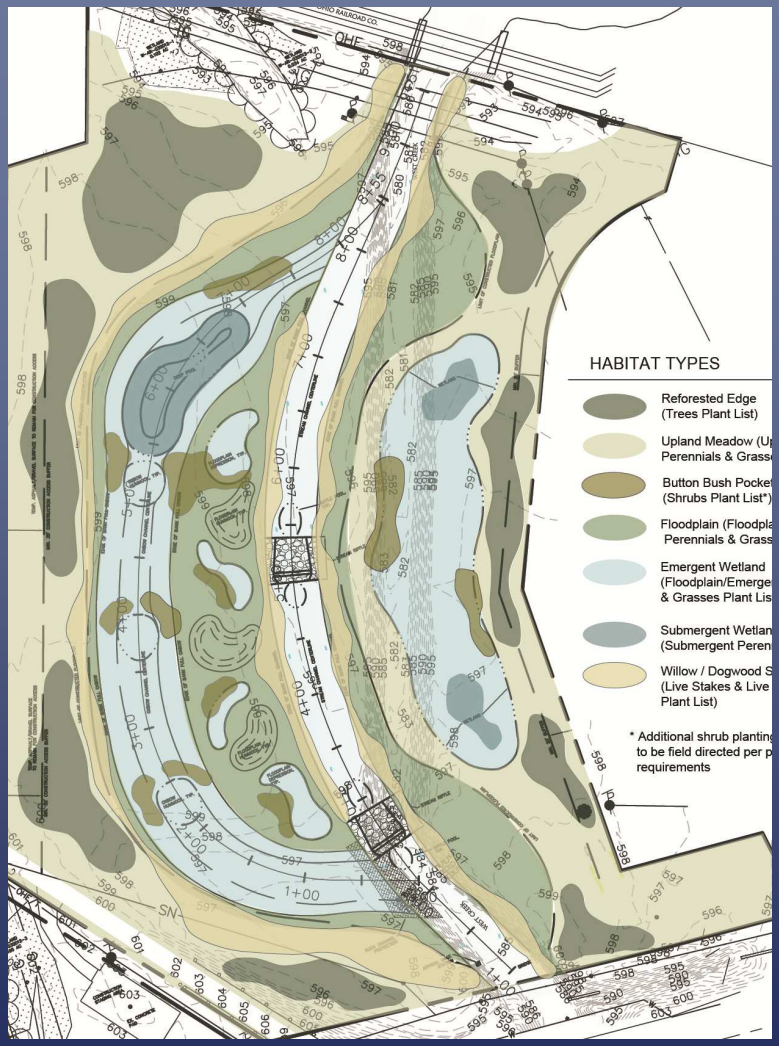
- Green Infrastructure (GI) offers solutions to many municipal problems in addition to water quantity and quality issues

- Multiple purpose projects address issues such as water quality, neighborhood flood relief, open space, recreation, public health, beautification, and urban revitalization.

- Parks, stream corridors, golf courses, landfills, vacant and foreclosed properties represent large scale GI opportunities.

Implementation Strategies

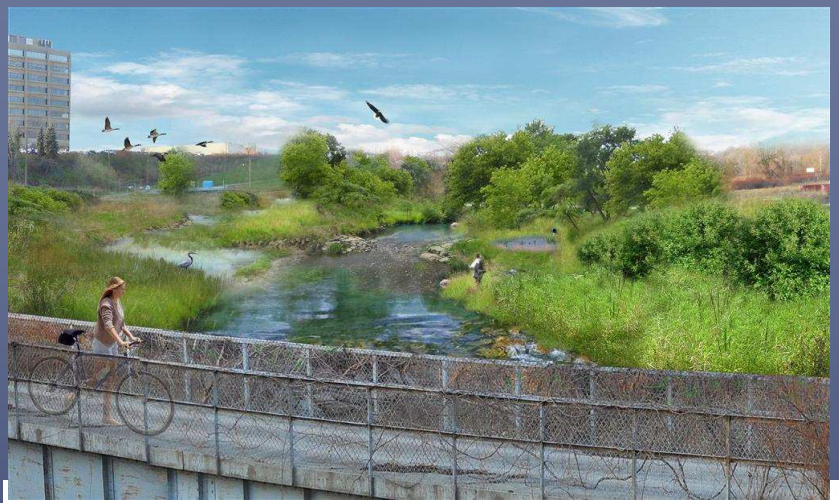
- Case Studies illustrate a variety of funding and implementation strategies for large and small municipalities such as:
  - Inter departmental partnerships:
    Engineering/Streets/Sewer/Parks
  - Inter Agency partnerships:
    Metroparks/DOT/Non Profits
  - Public/Private partnerships:
    Municipalities/Developers/Corporations

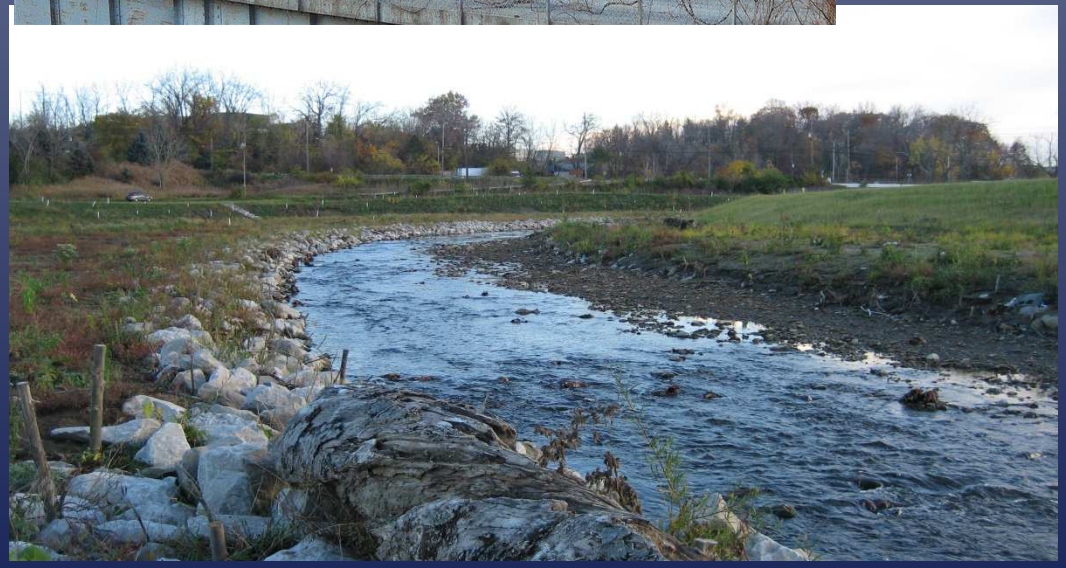


Urban Stream Restoration: Flooded Property

West Creek Confluence Restoration,
Cleveland, Ohio, Northeast Ohio Regional Sewer District:
8 ac. Floodplain Restoration, 1500 LF Stream Restoration

West Creek Confluence Restoration



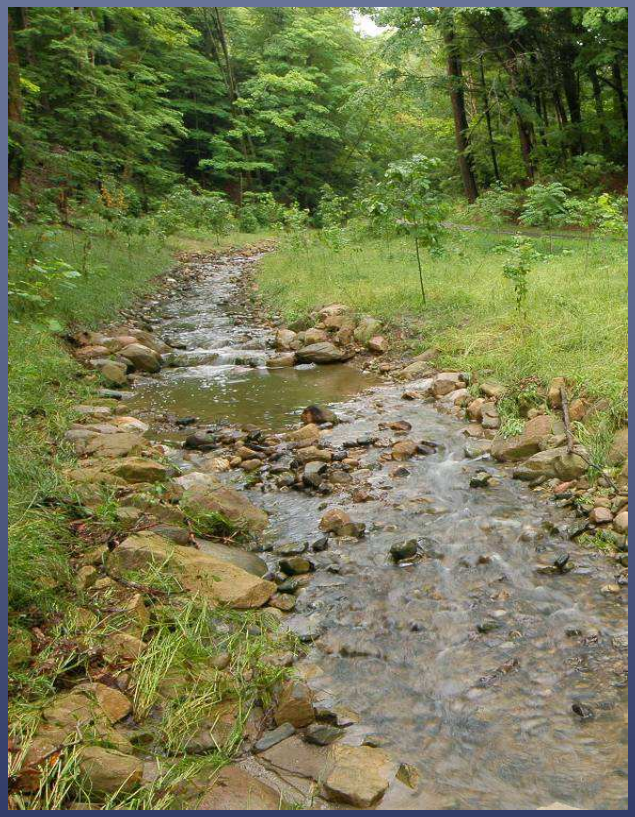


Post Construction:
During initial Vegetation Establishment

Interagency Partnership, $3M WRRSP grant funding

Urban Stream Restoration, Parks

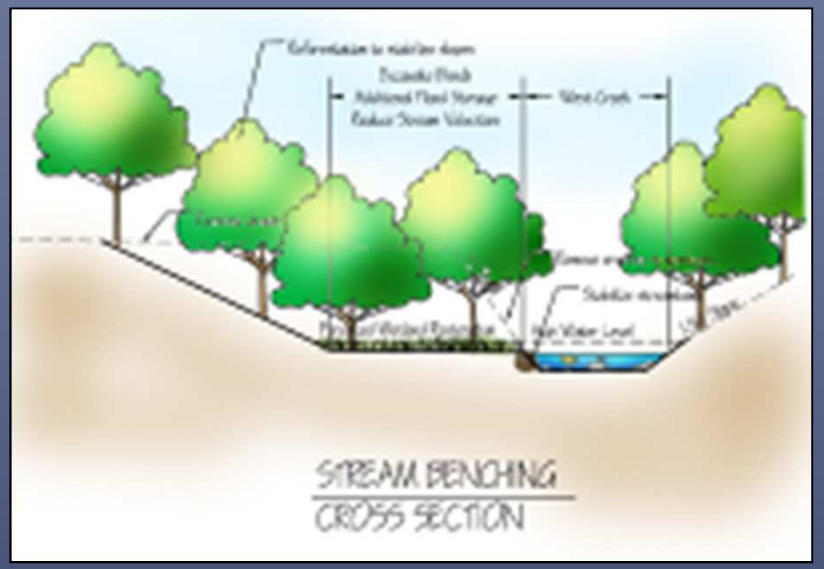
Before



After

Upper 40/Fosters Run Restoration, Mayfield Village, Oh: 3000 LF Stream Restoration, Stream Daylighting, Floodplain Restoration, Erosion Control, Bank stabilization,

Upper 40/Foster's Run Restoration



Floodplain Restoration, Erosion Control, Bank stabilization, Reduces Peak discharge 35%, $1.2 M Clean Ohio Grant Funding , Interagency Partnership Mayfield Village - Cleveland Metroparks

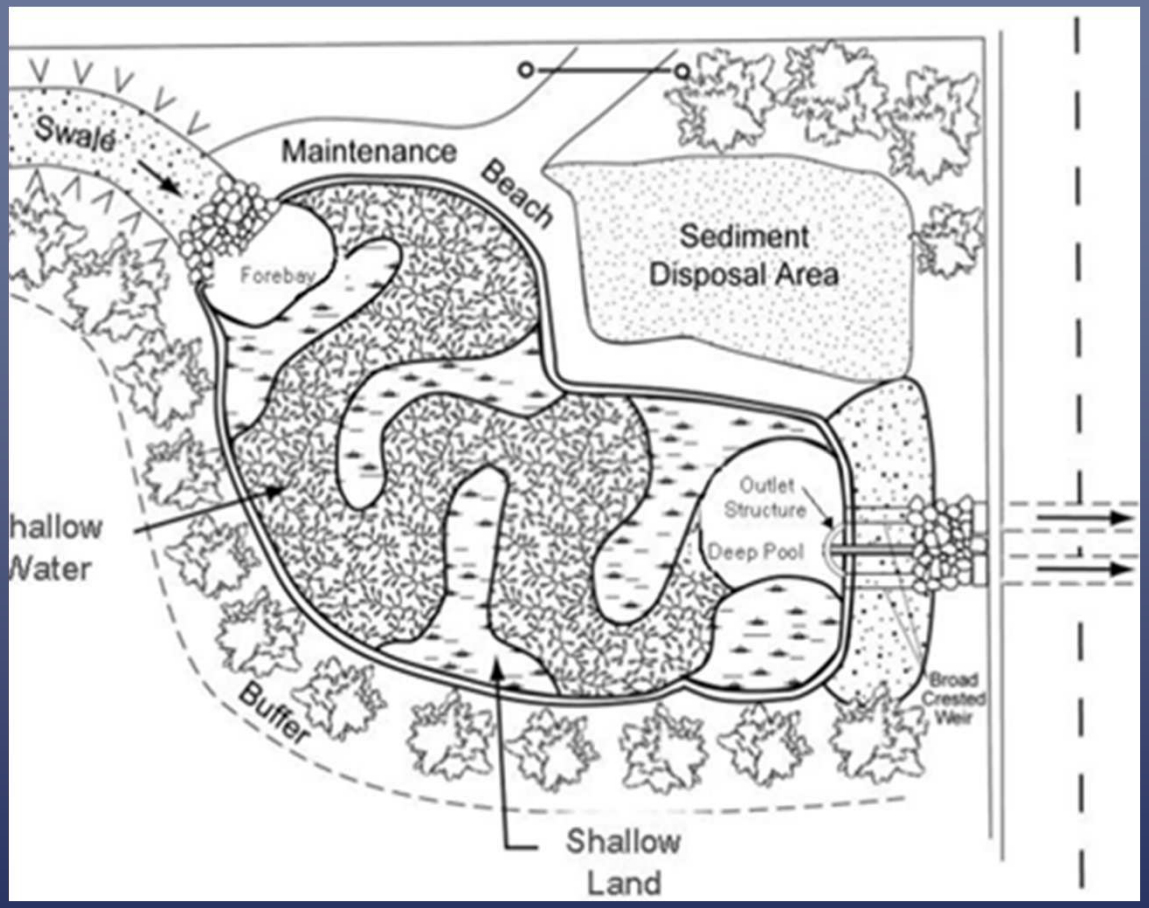
Stream Restoration, Golf Courses

Pleasant Run Restoration, Indianapolis, Indiana, Indiana DOT
6300 LF Stream Mitigation, 95 ac Golf Course,

Stream Restoration, Golf Courses

Restoration measures: Floodplain Restoration, Riparian Vegetation Buffers, Balance Golf and Riparian Buffer Functions, Repairs Stream Banks Instability, Interagency Partnership Indianapolis - Indiana DOT

Stormwater Wetlands



Diagrammatic Plan of Stormwater Wetland

Design Elements:

- Forebay, Sediment Deposition
- Circuitous Wetland, Increased flow path for Microbial Breakdown
- Wetland Plants, Nutrient Uptake

Stormwater Treatment Wetlands Pollutant Removal Capabilities

Pollutant	Removal Rates (%)
Total Suspended Solids	75%
Total Phosphorous	45%
Total Nitrogen	25%
Organic Carbon	15%
Lead	75%
Zinc	50%
Bacteria	2 log reduction

From: Design of Stormwater Wetlands

Metropolitan Washington Council of Gov'ts

Stormwater Wetlands, Parks

Wetland Conservation Area, Columbus, Ohio, Ohio DOT: 25 ac. Open Space, 13 ac. Wetland Mitigation, Reduces peak discharges by 25%, Stormwater Treatment, Educational Land Lab to support VocEd program, Public/Private Partnership

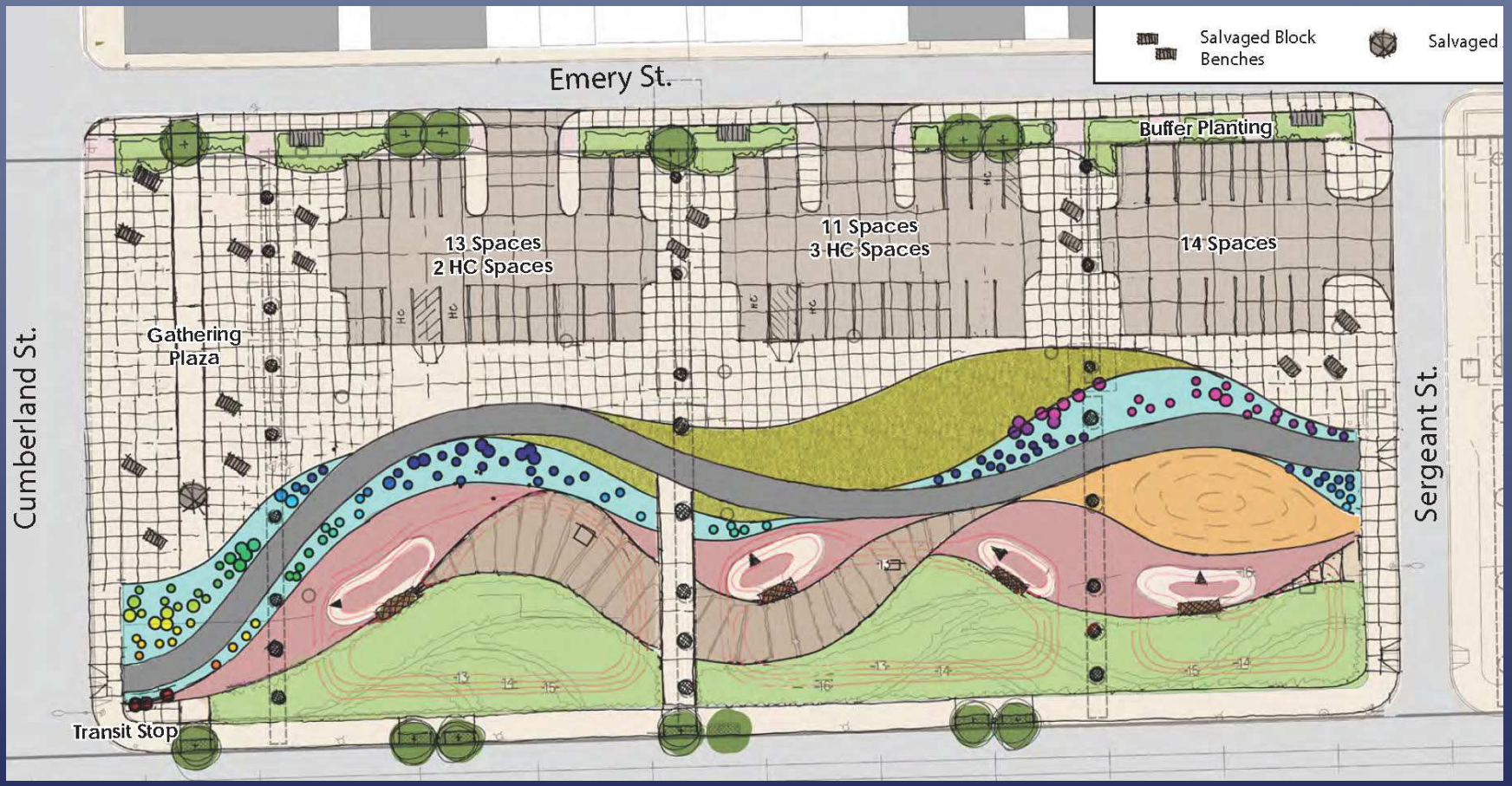
Landfill Conversion to Green Spaces

Landfill Cap Naturalization, Wellsville, NY
Leachate Treatment Wetlands, Community Open Space, Trail Linkages, Private Sector remediation, Public/Private Partnership

Green Roadway Corridors

I-95 Rehabilitation, Green Infrastructure Improvements,
Philadelphia, Pa., Pennsylvania DOT:
2 mile urban corridor, 30 GI basins, Runoff Reduction, CSO reduction, Runoff Filtration, 20 ac. Useable Urban Open Space, Trail Linkage, Neighborhood Beautification

I-95 Green Infrastructure



2 mile urban corridor, 30 GI basins, Runoff Reduction, CSO Reduction, Runoff Filtration, Basins Under Highway Bridges

Valuation of Benefits

- The multiple and Triple Bottom Line (TBL) benefits of Green Infrastructure are significant and economically quantifiable.

- The Philadelphia TBL Analysis rankings of economic benefits:
  1. Public Health
  2. Aesthetics, Property Value Increases
  3. Recreation
  4. Water Quality

Optimizing Stormwater Results

- Multidiscipline Team Required: Engineers, Landscape Architects, Biologists, Permitting Specialists
- Design to Balance and Optimize the Multiple Benefits
- Identifying Permeable Soils
- Hydraulic Modeling to reduce Flood Elevations, Peak Discharges, High velocities
- Public/Ratepayer Visibility, Public Education, Public Engagement

Green Infrastructure Implementation Strategies

- Interdepartmental Partnerships:
  Engineering/Streets/Sewer/Parks

- Interagency Partnerships:
  Metroparks/DOT/Non Profits

- Public/Private Partnerships:
  Municipalities/Developers/Corporations

- Grant Funding for Wetland and Stream Restoration:
  OEPA WRRSP, 319, SWIF, Clean Ohio

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